

- (c) subtracting the first backscattered-particle signal from the second backscattered-particle signal to obtain a difference signal; and
- (d) determining the alignment-mark position from the difference signal.

2. (Amended) The method of claim 1, wherein step (a) is performed by scanning the charged particle beam across a smooth planar region of the surface of the specimen.

4. (Amended) The method of claim 1, wherein:

the first backscattered-particle signal is obtained by scanning the charged particle beam across a smooth planar region of the surface of the specimen that represents the crystal-orientation plane, and

in step (c), the subtraction of the first backscattered-particle signal from the second backscattered-particle signal removes data, concerning the crystal-orientation plane, from the difference signal that otherwise would obfuscate data in the difference signal pertaining to the alignment mark.

6. (Amended) In a charged-particle-beam (CPB) microlithography apparatus including a CPB source that produces a charged particle beam, a CPB-optical system through which the charged particle beam passes from the CPB source to a substrate of which a surface has a crystal-lattice orientation and includes an alignment mark formed on the surface, and a substrate stage on which the substrate is placed for exposure by the charged particle beam, a device for measuring an alignment of the substrate, the device comprising:

a deflector situated and configured to deflect the charged particle beam to cause the beam to irradiate a predetermined location on the surface of the substrate mounted on the substrate stage, so as to cause the location to produce backscattered particles;

a backscattered-particle detector situated and configured to detect backscattered charged particles produced by the location on the substrate as the location is irradiated by the charged particle beam;

a controller connected to the deflector and the backscattered-particle detector, the controller being configured to (i) energize the deflector in a manner causing the deflector to irradiate the beam on a first location on the surface lacking an alignment mark, thereby

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producing a background backscattered-particle signal including data generated by backscatter from features associated with the crystal-lattice orientation; (ii) energize the deflector in a manner causing the deflector to irradiate the beam on the alignment mark, thereby producing an alignment-mark backscattered-particle signal; (iii) calculate a difference signal by subtracting the background signal from the alignment-mark signal; and (iv) determine the position of the alignment mark from the difference signal.

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Please add the following new claim:

13. (New) The method of claim 1, wherein the first backscattered-particle signal includes data produced by scanning the charged particle beam across one or more Kikuchi lines on the surface.

REMARKS

Reconsideration of the subject application is requested in view of the foregoing amendments and the following remarks.

Claims 1-12 are pending. In this Amendment, claims 1, 2, 4, and 6 are amended; and all other pending claims are unchanged. New claim 13 is submitted for consideration.

Claims 1 and 6 are amended to clarify that the substrate has a surface having a crystal-lattice orientation. See specification page 3, lines 8-19; page 4, lines 20-28; page 7, lines 6-15. Thus, effectively, a portion of claim 4 is now added to claim 1, which resulted in amendment of claim 4.

New claim 13 is directed specifically to backscatter from Kikuchi lines. See specification page 7, lines 16-29.

The applicant thanks the examiner for performing the search in connection with substantive examination of the subject claims.

The instant Office action came on the heels of a prior "final" Office action dated September 23, 2002. Upon receiving the 9/23 Office action, the undersigned telephoned the examiner on September 30, 2002, to traverse the finality of it. Specifically, in the telephonic interview on September 30, 2002, the undersigned stated that the 9/23 action should not be final because it contained new grounds for rejection that did not result from a previous amendment.